

CLAIMS:

1. A method of eliciting or inducing, in a mammal, an immune response directed to a micro-organism said method comprising administering to said mammal an effective amount of an immunogenic composition which composition comprises a molecule capable of inducing an immune response directed to the inositol glycan domain of a GPI but which molecule is substantially incapable of inducing an immune response directed to a lipidic domain of GPI.
2. A method according to claim 1 wherein said molecule is a modified GPI molecule or derivative or equivalent thereof and which modified GPI molecule comprises insufficient lipidic domain to induce or elicit an immune response directed to a GPI lipidic domain.
3. A method according to claim 2 wherein said modified GPI molecule is the inositolglycan domain portion of GPI or derivative or equivalent thereof.
4. A method according to claim 2 ~~or 3~~ wherein said modified GPI molecule is a modified parasite GPI molecule or derivative or equivalent thereof.
5. A method according to claim 4 wherein said parasite is *Plasmodium*.
6. A method according to claim 5 wherein said *Plasmodium* is *Plasmodium falciparum*.
7. A method according to claim 6 wherein said modified *Plasmodium falciparum* GPI molecule is a *Plasmodium falciparum* GPI inositolglycan domain.

- ethanolamine-phosphate-(Man
- α
- 1,2)-Man
- α
- 1,2Man
- α
- 1,6Man
- α
- 1,4GlcN-
- myo*
- inositol phosphoglycerol

or derivative or equivalent thereof.

- X₁ - X₂ - X₃ -X₄- ethanolamine-phosphate-(Manα1,2)-
Manα1,2Manα1,6Manα1,4GlcN-*myo*-inositol phosphoglycerol

wherein X₁, X₂, X₃ and X₄ are any 4 amino acids, or derivative or equivalent of said GPI inositolglycan domain.

10. A method according to claim 7 wherein said GPI inositolglycan domain comprises a structure selected from:

EtN-P-[Ma₂]Ma₂ Ma₆ Ma₄Ga₆Ino

EtN-P-[Mα2][G]Mα2 Mα6 Mα4Ga6Ino

EtN-P-[Mα2][X]Mα2 Mα6 Mα4Ga6Ino

EtN-P-[Mα2][EtN-P]Mα2 Mα6 Mα4Ga6Ino

EtN-P-M α 2 M α 6 M α 4GM α 2 M α 6 M α 4GEtN-P-M α 2 M α 6 M

EtN-P-[M α 2][G]M α 2 M α 6 M α 4G

EtN-P-[M α 2][X]M α 2 M α 6 M α 4G

EtN-P-[M α 2][EtN-P]M α 2 M α 6 M α 4G

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$\text{Ma}_2 [\text{Ma}_2][\text{G}]\text{Ma}_2 \text{Ma}_6 \text{Ma}_4\text{G}$
 $\text{Ma}_2 [\text{Ma}_2][\text{X}]\text{Ma}_2 \text{Ma}_6 \text{Ma}_4\text{G}$
 $\text{Ma}_2 [\text{Ma}_2][\text{EtN-P}]\text{Ma}_6 \text{Ma}_4\text{G}$
 $\text{Ma}_6 \text{Ma}_4\text{Ga}_6\text{Ino}$
 $\text{Ma}_2 \text{Ma}_6 \text{Ma}_4\text{Ga}_6\text{Ino}$
 $\text{Ma}_2 [\text{Ma}_2]\text{Ma}_6 \text{Ma}_4\text{Ga}_6\text{Ino}$
 $\text{Ma}_2 [\text{Ma}_2][\text{G}]\text{Ma}_6 \text{Ma}_4\text{Ga}_6\text{Ino}$
 $\text{Ma}_2 [\text{Ma}_2][\text{X}]\text{Ma}_6 \text{Ma}_4\text{Ga}_6\text{Ino}$
 $\text{EtN-P-}[\text{Ma}_2][\text{G}]\text{Ma}_2 \text{Ma}_6 \text{M}$
 $\text{EtN-P-}[\text{Ma}_2][\text{X}]\text{Ma}_2 \text{Ma}_6 \text{M}$
 $\text{EtN-P-}[\text{Ma}_2][\text{EtN-P}]\text{Ma}_2 \text{Ma}_6 \text{M}$
 $\text{Ma}_2 [\text{Ma}_2][\text{G}]\text{Ma}_2 \text{Ma}_6 \text{M}$
 $\text{Ma}_2 [\text{Ma}_2][\text{X}]\text{Ma}_2 \text{Ma}_6 \text{M}$
 $\text{Ma}_2 [\text{Ma}_2][\text{EtN-P}]\text{Ma}_6 \text{M}$
 $\text{Ma}_2 \text{Ma}_6 \text{M}$
 $\text{Ma}_6 \text{Ma}_4\text{G}$
 $\text{EtN-P-}[\text{Ma}_2][\text{G}]\text{Ma}_2 \text{M}$
 $\text{EtN-P-}[\text{Ma}_2][\text{X}]\text{Ma}_2 \text{M}$
 $\text{EtN-P-}[\text{Ma}_2][\text{EtN-P}]\text{Ma}_2 \text{M}$

or derivative or equivalent thereof wherein EtN is ethanolamine, P is phosphate, M is mannose, G is non-N-acetylated glucosamine, [G] is any non-N-acetylated hexosamine, Ino is inositol or inositol-phosphoglycerol, [X] is any other substituent, α represents α -linkages which may be substituted with β -linkages wherever required, and numeric values represent positional linkages which may be substituted with any other positional linkages as required.

11. A method of therapeutically or prophylactically treating a mammal for a micro-organism infection said method comprising administering to said mammal an effective amount of an immunogenic composition which composition comprises a

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molecule capable of inducing an immune response directed to the inositolglycan domain of a GPI, but substantially incapable of inducing an immune response directed to the lipid domain of a GPI, for a time and under conditions sufficient for said immune response to reduce, inhibit or otherwise alleviate any one or more symptoms associated with infection of said mammal by said micro-organism.

12. A method according to claim 11 wherein said molecule is a modified GPI molecule or derivative or equivalent thereof and which modified GPI molecule comprises insufficient lipid domain to induce or elicit an immune response directed to a GPI lipidic domain.
13. A method according to claim 12 wherein said micro-organism infection is a parasite infection.
14. A method according to claim 13 wherein said parasite is *Plasmodium*.
15. A method according to claim 14 wherein said *Plasmodium* is *Plasmodium falciparum*.
16. A method according to any one of ^{claim 13} ~~claims 13-15~~ wherein said modified GPI molecule is a modified parasite GPI molecule or derivative or equivalent thereof.
17. A method according to claim 16 wherein said parasite is *Plasmodium*.
18. A method according to claim 17 wherein a said *Plasmodium* is *Plasmodium falciparum*.
19. A method according to claim 18 wherein said modified *Plasmodium falciparum* GPI molecule is a *Plasmodium falciparum* GPI inositolglycan domain.

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20. A method according to claim 19 wherein said GPI inositolglycan domain comprises the structure

ethanolamine-phosphate-(Man α 1,2)-Man α 1,2Man α 1,6Man α 1,4GlcN-*myo*-
inositol phosphoglycerol

or derivative or equivalent thereof.

21. A method according to claim 19 wherein said GPI inositolglycan domain comprises the structure

X₁ - X₂ - X₃ - X₄ - ethanolamine-phosphate-(Man α 1,2)-
Man α 1,2Man α 1,6Man α 1,4GlcN-*myo*-inositol phosphoglycerol

wherein X₁, X₂, X₃ and X₄ are any 4 amino acids, or derivative or equivalent of said GPI inositolglycan domain.

22. A method according to claim 19 wherein said GPI inositolglycan domain comprises a structure selected from:

EtN-P-[M α 2]M α 2 M α 6 M α 4G α 6Ino
EtN-P-[M α 2][G]M α 2 M α 6 M α 4G α 6Ino
EtN-P-[M α 2][X]M α 2 M α 6 M α 4G α 6Ino
EtN-P-[M α 2][EtN-P]M α 2 M α 6 M α 4G α 6Ino
EtN-P-M α 2 M α 6 M α 4G
M α 2 M α 6 M α 4G
EtN-P-M α 2 M α 6 M
EtN-P-[M α 2][G]M α 2 M α 6 M α 4G
EtN-P-[M α 2][X]M α 2 M α 6 M α 4G
EtN-P-[M α 2][EtN-P]M α 2 M α 6 M α 4G

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$\text{Ma}_2 [\text{Ma}_2][\text{G}]\text{Ma}_2 \text{Ma}_6 \text{Ma}_4\text{G}$
 $\text{Ma}_2 [\text{Ma}_2][\text{X}]\text{Ma}_2 \text{Ma}_6 \text{Ma}_4\text{G}$
 $\text{Ma}_2 [\text{Ma}_2][\text{EtN-P}]\text{Ma}_6 \text{Ma}_4\text{G}$
 $\text{Ma}_6 \text{Ma}_4\text{Ga}_6\text{Ino}$
 $\text{Ma}_2 \text{Ma}_6 \text{Ma}_4\text{Ga}_6\text{Ino}$
 $\text{Ma}_2 [\text{Ma}_2]\text{Ma}_6 \text{Ma}_4\text{Ga}_6\text{Ino}$
 $\text{Ma}_2 [\text{Ma}_2][\text{G}]\text{Ma}_6 \text{Ma}_4\text{Ga}_6\text{Ino}$
 $\text{Ma}_2 [\text{Ma}_2][\text{X}]\text{Ma}_6 \text{Ma}_4\text{Ga}_6\text{Ino}$
 $\text{EtN-P-}[\text{Ma}_2][\text{G}]\text{Ma}_2 \text{Ma}_6 \text{M}$
 $\text{EtN-P-}[\text{Ma}_2][\text{X}]\text{Ma}_2 \text{Ma}_6 \text{M}$
 $\text{EtN-P-}[\text{Ma}_2][\text{EtN-P}]\text{Ma}_2 \text{Ma}_6 \text{M}$
 $\text{Ma}_2 [\text{Ma}_2][\text{G}]\text{Ma}_2 \text{Ma}_6 \text{M}$
 $\text{Ma}_2 [\text{Ma}_2][\text{X}]\text{Ma}_2 \text{Ma}_6 \text{M}$
 $\text{Ma}_2 [\text{Ma}_2][\text{EtN-P}]\text{Ma}_6 \text{M}$
 $\text{Ma}_2 \text{Ma}_6 \text{M}$
 $\text{Ma}_6 \text{Ma}_4\text{G}$
 $\text{EtN-P-}[\text{Ma}_2][\text{G}]\text{Ma}_2 \text{M}$
 $\text{EtN-P-}[\text{Ma}_2][\text{X}]\text{Ma}_2 \text{M}$
 $\text{EtN-P-}[\text{Ma}_2][\text{EtN-P}]\text{Ma}_2 \text{M}$

or derivative or equivalent thereof wherein EtN is ethanolamine, P is phosphate, M is mannose, G is non-N-acetylated glucosamine, [G] is any non-N-acetylated hexosamine, Ino is inositol or inositol-phosphoglycerol, [X] is any other substituent, α represents α -linkages which may be substituted with β -linkages wherever required, and numeric values represent positional linkages which may be substituted with any other positional linkages as required.

23. A method for the treatment and/or prophylaxis of a mammalian disease condition characterised by a micro-organism infection, said method comprising administering to said mammal an effective amount of an immunogenic

composition which composition comprises a molecule capable of inducing an immune response directed to the inositolglycan domain of a GPI, but substantially incapable of inducing an immune response directed to the lipid domain of a GPI, for a time and under conditions sufficient for said immune response to reduce, inhibit or otherwise alleviate any one or more symptoms associated with said micro-organism infections.

24. A method according to claim 23 wherein said molecule is a modified GPI molecule or derivative or equivalent thereof and which modified GPI molecule comprises insufficient lipid domain to induce or elicit an immune response directed to a GPI lipidic domain.
25. A method according to claim 24 wherein said modified GPI molecule is the inositolglycan domain portion of GPI or derivative or equivalent thereof.
26. A method according to claim 24 ~~or 25~~ wherein said modified GPI molecule is a modified parasite GPI molecule or derivative or equivalent thereof.
27. A method according to claim 26 wherein said parasite is *Plasmodium*.
28. A method according to claim 27 wherein said *Plasmodium* is *Plasmodium falciparum*.
29. A method according to claim 28 wherein said modified *Plasmodium falciparum* GPI molecule is a *Plasmodium falciparum* GPI inositolglycan domain.
30. A method according to claim 29 wherein said GPI inositolglycan domain comprises the structure

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ethanolamine-phosphate-(Man α 1,2)-Man α 1,2Man α 1,6Man α 1,4GlcN-*myo*-
inositol phosphoglycerol

or derivative or equivalent thereof.

31. A method according to claim 29 wherein said GPI inositolglycan domain comprises the structure

X₁ - X₂ - X₃ -X₄ - ethanolamine-phosphate-(Man α 1,2)-
Man α 1,2Man α 1,6Man α 1,4GlcN-*myo*-inositol phosphoglycerol

wherein X₁, X₂, X₃ and X₄ are any 4 amino acids, or derivative or equivalent of said GPI inositolglycan domain.

32. A method according to claim 29 wherein said GPI inositolglycan domain comprises the structure:

EtN-P-[Ma2]Ma2 Ma6 Ma4Ga6Ino
EtN-P-[Ma2][G]Ma2 Ma6 Ma4Ga6Ino
EtN-P-[Ma2][X]Ma2 Ma6 Ma4Ga6Ino
EtN-P-[Ma2][EtN-P]Ma2 Ma6 Ma4Ga6Ino
EtN-P-Ma2 Ma6 Ma4G
Ma2 Ma6 Ma4G
EtN-P-Ma2 Ma6 M
EtN-P-[Ma2][G]Ma2 Ma6 Ma4G
EtN-P-[Ma2][X]Ma2 Ma6 Ma4G
EtN-P-[Ma2][EtN-P]Ma2 Ma6 Ma4G
Ma2 [Ma2][G]Ma2 Ma6 Ma4G
Ma2 [Ma2][X]Ma2 Ma6 Ma4G
Ma2 [Ma2][EtN-P]Ma6 Ma4G
Ma6 Ma4Ga6Ino

$\text{Ma}_2 \text{Ma}_6 \text{Ma}_4 \text{Ga}_6 \text{Ino}$
 $\text{Ma}_2 [\text{Ma}_2] \text{Ma}_6 \text{Ma}_4 \text{Ga}_6 \text{Ino}$
 $\text{Ma}_2 [\text{Ma}_2] [\text{G}] \text{Ma}_6 \text{Ma}_4 \text{Ga}_6 \text{Ino}$
 $\text{Ma}_2 [\text{Ma}_2] [\text{X}] \text{Ma}_6 \text{Ma}_4 \text{Ga}_6 \text{Ino}$
 $\text{EtN-P-} [\text{Ma}_2] [\text{G}] \text{Ma}_2 \text{Ma}_6 \text{M}$
 $\text{EtN-P-} [\text{Ma}_2] [\text{X}] \text{Ma}_2 \text{Ma}_6 \text{M}$
 $\text{EtN-P-} [\text{Ma}_2] [\text{EtN-P}] \text{Ma}_2 \text{Ma}_6 \text{M}$
 $\text{Ma}_2 [\text{Ma}_2] [\text{G}] \text{Ma}_2 \text{Ma}_6 \text{M}$
 $\text{Ma}_2 [\text{Ma}_2] [\text{X}] \text{Ma}_2 \text{Ma}_6 \text{M}$
 $\text{Ma}_2 [\text{Ma}_2] [\text{EtN-P}] \text{Ma}_6 \text{M}$
 $\text{Ma}_2 \text{Ma}_6 \text{M}$
 $\text{Ma}_6 \text{Ma}_4 \text{G}$
 $\text{EtN-P-} [\text{Ma}_2] [\text{G}] \text{Ma}_2 \text{M}$
 $\text{EtN-P-} [\text{Ma}_2] [\text{X}] \text{Ma}_2 \text{M}$
 $\text{EtN-P-} [\text{Ma}_2] [\text{EtN-P}] \text{Ma}_2 \text{M}$

or derivative or equivalent thereof wherein EtN is ethanolamine, P is phosphate, M is mannose, G is non-N-acetylated glucosamine, [G] is any non-N-acetylated hexosamine, Ino is inositol or inositol-phosphoglycerol, [X] is any other substituent, α represents α -linkages which may be substituted with β -linkages wherever required, and numeric values represent positional linkages which may be substituted with any other positional linkages as required.

33. A method according to any one of ^{claim 24} ~~claims 24-31~~ wherein said disease condition is malaria.
34. Use of a composition comprising a molecule capable of inducing an immune response directed to a micro-organism GPI inositolglycan domain but substantially incapable of inducing an immune response directed to a lipidic domain of GPI in the manufacture of a medicament for the therapeutic and/or

prophylactic treatment of a mammalian disease condition characterised by infection with said micro-organism.

35. A method according to claim 34 wherein said composition comprises a *Plasmodium* GPI inositolglycan domain or derivative or equivalent thereof which inositolglycan domain comprises insufficient lipidic domain of a *Plasmodium* GPI to elicit or induce an immune response directed to a GPI lipidic domain.
36. A composition capable of inducing an immune response directed to a micro-organism said composition comprising a molecule capable of inducing an immune response against a micro-organism GPI inositolglycan domain but substantially incapable of inducing an immune response to a lipidic domain of a GPI.
37. A composition according to claim 36 wherein said molecule comprises a modified GPI molecule or derivative or equivalent thereof which modified GPI molecule comprises insufficient lipidic domain to induce or elicit an immune response directed to a GPI lipidic domain.
38. A vaccine composition comprising as the active component a molecule capable of inducing an immune response directed to a micro-organism GPI inositolglycan domain but substantially incapable of inducing an immune response directed to a lipidic domain of a GPI, together with one or more pharmaceutically acceptable carriers and/or diluents.
39. A vaccine composition according to claim 38 wherein said molecule comprises a modified GPI molecule or derivative or equivalent thereof which modified GPI molecule comprises insufficient lipidic domain to induce or elicit an immune response directed to a GPI lipidic domain.

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40. A pharmaceutical composition comprising a molecule capable of inducing an immune response directed to a micro-organism GPI inositolglycan domain but substantially incapable of inducing an immune response directed to a lipidic domain of a GPI together with one or more pharmaceutically acceptable carriers and/or diluents.
41. A pharmaceutical composition according to claim 40 wherein said molecule comprises a modified GPI molecule or derivative or equivalent thereof which modified GPI molecule comprises insufficient lipidic domain to induce or elicit an immune response directed to a GPI lipidic domain.
42. A composition according to any one of claims 37, ~~39 or 41~~ wherein said modified GPI molecule is the inositolglycan domain portion of GPI or a derivative or equivalent thereof.
43. A composition according to any one of claims 37, ~~39, 41 or 42~~ wherein said modified GPI molecule is a modified parasite GPI molecule or derivative or equivalent thereof.
44. A composition according to claim 43 wherein said parasite is *Plasmodium*.
45. A composition according to claim 41 wherein said *Plasmodium* is *P.falciparum*.
46. A composition according to claim 42 wherein said modified *Plasmodium falciparum* GPI molecule is a *Plasmodium falciparum* GPI inositolglycan domain.
47. A composition according to claim 46 wherein said GPI inositolglycan domain comprises the structure

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ethanolamine-phosphate-(Man α 1,2)-Man α 1,2Man α 1,6Man α 1,4GlcN-*myo*-
inositol phosphoglycerol

or derivative or equivalent thereof.

48. A composition according to claim 46 wherein said GPI inositolglycan domain comprises the structure

X₁ - X₂ - X₃ -X₄ - ethanolamine-phosphate-(Man α 1,2)-
Man α 1,2Man α 1,6Man α 1,4GlcN-*myo*-inositol phosphoglycerol

wherein X₁, X₂, X₃ and X₄ are any 4 amino acids, or derivative or equivalent of said GPI inositolglycan domain.

49. A composition according to claim 46 wherein said GPI inositolglycan domain comprises the structure:

EtN-P-[Ma2]Ma2 Ma6 Ma4Ga6Ino
EtN-P-[Ma2][G]Ma2 Ma6 Ma4Ga6Ino
EtN-P-[Ma2][X]Ma2 Ma6 Ma4Ga6Ino
EtN-P-[Ma2][EtN-P]Ma2 Ma6 Ma4Ga6Ino
EtN-P-Ma2 Ma6 Ma4G
Ma2 Ma6 Ma4G
EtN-P-Ma2 Ma6 M
EtN-P-[Ma2][G]Ma2 Ma6 Ma4G
EtN-P-[Ma2][X]Ma2 Ma6 Ma4G
EtN-P-[Ma2][EtN-P]Ma2 Ma6 Ma4G
Ma2 [Ma2][G]Ma2 Ma6 Ma4G
Ma2 [Ma2][X]Ma2 Ma6 Ma4G
Ma2 [Ma2][EtN-P]Ma6 Ma4G
Ma6 Ma4Ga6Ino

$\text{Ma}_2 \text{Ma}_6 \text{Ma}_4 \text{Ga}_6 \text{Ino}$
 $\text{Ma}_2 [\text{Ma}_2] \text{Ma}_6 \text{Ma}_4 \text{Ga}_6 \text{Ino}$
 $\text{Ma}_2 [\text{Ma}_2] [\text{G}] \text{Ma}_6 \text{Ma}_4 \text{Ga}_6 \text{Ino}$
 $\text{Ma}_2 [\text{Ma}_2] [\text{X}] \text{Ma}_6 \text{Ma}_4 \text{Ga}_6 \text{Ino}$
 $\text{EtN-P-} [\text{Ma}_2] [\text{G}] \text{Ma}_2 \text{Ma}_6 \text{M}$
 $\text{EtN-P-} [\text{Ma}_2] [\text{X}] \text{Ma}_2 \text{Ma}_6 \text{M}$
 $\text{EtN-P-} [\text{Ma}_2] [\text{EtN-P}] \text{Ma}_2 \text{Ma}_6 \text{M}$
 $\text{Ma}_2 [\text{Ma}_2] [\text{G}] \text{Ma}_2 \text{Ma}_6 \text{M}$
 $\text{Ma}_2 [\text{Ma}_2] [\text{X}] \text{Ma}_2 \text{Ma}_6 \text{M}$
 $\text{Ma}_2 [\text{Ma}_2] [\text{EtN-P}] \text{Ma}_6 \text{M}$
 $\text{Ma}_2 \text{Ma}_6 \text{M}$
 $\text{Ma}_6 \text{Ma}_4 \text{G}$
 $\text{EtN-P-} [\text{Ma}_2] [\text{G}] \text{Ma}_2 \text{M}$
 $\text{EtN-P-} [\text{Ma}_2] [\text{X}] \text{Ma}_2 \text{M}$
 $\text{EtN-P-} [\text{Ma}_2] [\text{EtN-P}] \text{Ma}_2 \text{M}$

or derivative or equivalent thereof wherein EtN is ethanolamine, P is phosphate, M is mannose, G is non-N-acetylated glucosamine, [G] is any non-N-acetylated hexosamine, Ino is inositol or inositol-phosphoglycerol, [X] is any other substituent, α represents α -linkages which may be substituted with β -linkages wherever required, and numeric values represent positional linkages which may be substituted with any other positional linkages as required.

50. An antibody directed to a GPI inositolglycan domain but which antibody is substantially incapable of interacting with the lipidic domain of a GPI.
51. A pharmaceutical composition comprising an antibody directed to a GPI inositolglycan domain, but which antibody is substantially incapable of interacting with a GPI lipidic domain, together with one or more pharmaceutically acceptable carriers and/or diluents.

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